



# Torchbearer National Security Report



## The New Paradigm: Bringing U.S. Army Logistics into the 21st Century



An AUSA Torchbearer Issue  
April 2004





1 April 2004

Speaking at the AUSA Logistics Symposium in Richmond, Virginia on 22 April 2003, the Honorable Michael Wynne, then Principal Deputy Under Secretary of Defense (Acquisition, Technology and Logistics), commended and congratulated the U.S. Army for its accomplishments up to that point in Operation Iraqi Freedom, not only by combat units but also by logistics units throughout the theater. He then issued a challenge: “Whether push or pull, our current logistics are reactive. At best, unless we embrace a new paradigm, we will be still depending on the warfighters to tell [the logisticians] what they need, then trying to supply it as fast as [they] can. This amounts to an industrial age vendor struggling to satisfy an information age customer. Reactive logistics—the old logistics—will never be able to keep up with warfare as we know it.”

The U.S. Army has embraced a new paradigm: proactive logistics for a joint and expeditionary Army. Army logisticians will be part of joint and combined processes that deliver materiel readiness to the warfighter. Under this new paradigm, Army logisticians will have the capability to see requirements in real time and to control a distribution system from factory to foxhole. They will make decisions based on accurate, timely logistics information. Their organizations that conduct force reception operations will not be ad hoc but will be organized and trained to transition rapidly from peace to war. Army Logistics of the future will set conditions to execute the joint concept of simultaneous deploy-employ-sustain operations.

In this latest installment of AUSA’s signature Torchbearer series, we analyze four Army logistics capabilities that, when matured, create this new paradigm and bring Army logistics into the 21st century in support of a “Joint and Expeditionary Army with Campaign Capabilities.” We hope you find this report a useful resource and that you will continue to look to AUSA for thoughtful, credible analysis of contemporary national security issues.

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GORDON R. SULLIVAN  
General, USA Retired  
President



# The New Paradigm: Bringing U.S. Army Logistics into the 21st Century

## EXECUTIVE SUMMARY

The logistics successes enjoyed during Operation Iraqi Freedom (OIF) were the result of the integrated logistics team of Soldiers, civilians and contractors who developed innovative solutions to a range of challenges caused by four major capability gaps in the current logistics system. To sustain combat power, the Army must have the ability to “see” requirements on demand via a logistics information network. The Army requires a responsive distribution system enabled by in-transit and total asset visibility and a single owner who has positive control end-to-end in the theater. The Army needs a robust, modular force-reception capability—a dedicated and trained organization able to quickly open a theater and support flexible, continuous sustainment throughout the joint operations area. The Army needs an integrated supply chain with a single proponent who can leverage all resources in a joint, interagency and multinational theater.

The December 2003 Army Logistics White Paper “Delivering Materiel Readiness to the Army”\* identifies four interdependent areas within logistics that are critical to the success of supporting the joint and expeditionary Army:

- **Connecting the Logisticians;**
- **Modernizing Theater Distribution;**
- **Improving Force Reception; and**
- **Integrating the Supply Chain.**

Army Logistics is one of the Army’s 17 immediate focus areas whose thrust is to provide even more relevant and ready landpower to combatant commanders. A four-pronged effort to lay the foundation for Army Logistics transformation is already underway.

### Connecting the Logisticians

The Army must:

- connect critical logistics nodes. Tactical warehouses, ammunition supply points, hospitals and distribution hubs (e.g., airports and seaports of embarkation/debarkation) will form a sustainment network using commercial very-small-aperture terminals (VSAT) for long-haul communications, coupled with Combat Service Support Automated Information System Interface (CAISI) wireless equipment to provide local area network connectivity.
- ensure non-line-of-sight (NLOS) connectivity to the battalion level. Army logisticians require a commercial expeditionary data communications capability comprising man-portable satellite communications terminals (e.g., International Maritime Satellite, or INMARSAT).
- enhance logistics operations at the tactical level. Battle Command Sustainment and Support System (BCS3) will provide the classified tactical logistics data warehouse serving the current and future Army and joint force. BCS3 will also provide logistics planning and assessment tools to the logistician.
- integrate Automated Identification Technology (AIT) throughout the joint battlespace. AIT will enable tomorrow’s logistics processes.

### Modernizing Theater Distribution

The Army must:

- resource radio frequency identification devices (RFID), the Movement Tracking System (MTS)

\* See <http://www.army.mil/features/LogWhitePaper2004/LogWhitePaper.doc> for text only or <http://www.army.mil/features/LogWhitePaper2004/LogWhitePaper.pdf> for text with images.





and other AIT in coordination with the Army's modularity efforts;

- insert maturing technology into current distribution platforms;
- develop intermodal cargo platforms compatible with the Theater Support Vessel (TSV), C-17 and C-130 aircraft, and the current wheeled vehicle fleet;
- resource the Precision Aerial Delivery System (PADS); and
- improve the strategic distribution process.

### **Improving Force Reception**

The Army must:

- transform a portion of its current force structure into a theater-opening group. This capability must be championed within the defense community to gain support for an organization that can leverage joint assets to receive the joint force.
- develop a joint theater logistics structure in coordination with the other services. Efforts must focus on those sustainment tasks that are

already designated as "joint" under the Executive Agency concept by the Office of the Secretary of Defense (OSD).

- replenish Army Prepositioned Stocks (APS) and reconfigure a portion of it into three Army Regional Flotillas (ARF). These squadrons will provide combat power, initial theater-opening assets and critical sustainment to support a brigade combat team (BCT), and will provide the nation with the capability to support humanitarian assistance and disaster relief operations.
- rebalance combat support and combat service support units to give the active component the capability to deploy an integrated element to open a theater and to execute joint theater sustainment operations for the first 30 days. Expansion of theater sustainment operations beyond 30 days will become a core competency for the reserve components.

### **Integrating the Supply Chain**

The Army must:

- support the initiative to designate a supply process owner for the joint community and





transition from item management to weapon system management at the national level.

- implement the Single Army Logistics Enterprise (SALE) strategy. Total asset and in-transit visibility infrastructure must be integrated within the Enterprise Resource Planning (ERP) architecture to remove organizational stovepipes.
- continue funding the centralized development efforts of ERP software such as BCS3, Global Combat Support System-Army (GCSS-A) and the Logistics Modernization Program (LMP).
- fund Product Life-Cycle Management Plus (PLM+) to centralize management of weapon system technical data. Army Logistics enterprise integration will merge the information currently held in two logistics databases—the Integrated Logistics Analysis Program (ILAP) and the Logistics Information Database (LIDB)—into PLM+ to provide a single point of entry into the supply chain for warfighters and logisticians.
- procure and integrate Business Process Server (BPS) hardware, including RFID. This action

will enable the Standard Army Retail Supply System (SARSS) to incorporate RFID data across the entire Army and replace the Materiel Release Order Control System (MROCS).

Logisticians are faced with preparing for deployment, force protection, sustainment of employed forces, and redeployment and reset of forces. Advances in both basic science and cutting-edge materiel and information technology research promise novel technologies that could enhance logistics functions and platforms. Army logisticians are exploring these benefits.

**This Torchbearer Report discusses a set of requirements within the domains of doctrine, organization, materiel and facilities that must be addressed to fix the capability gaps in Army Logistics. To accomplish this, Congress must fund the Department of Defense (DoD) at an amount approximating 4 percent of the gross domestic product (GDP) and increase the Army's share of the DoD budget to at least 28 percent to maintain readiness and transform the Army into the Future Force.**



## The New Paradigm: Bringing U.S. Army Logistics into the 21st Century

*We cannot do what we must on the battlefield without Combat Service Support. It sustains the ground maneuver forces' ability to see first, understand first, act first and win decisively.*

Lieutenant General Richard A. Cody  
Deputy Chief of Staff, G-3

### INTRODUCTION

The United States Army has embarked on a dynamic path to transform into a "Joint and Expeditionary Army with Campaign Capabilities." To rapidly effect necessary and positive change, the Army has established 17 immediate focus areas with specific guidance for planning, preparation and execution. The overall thrust of the effort is to provide even more "relevant and ready" landpower to the combatant commanders.

Initially, logistics was not envisioned as a single focus area; rather, it was viewed as an "integrating function" since it played a role in each focus area. [See AUSA Torchbearer Report "The U.S. Army in 2004 and Beyond: Strategically Agile and Adaptive," February 2004.] Further examination, however, revealed the critical need to provide specific guidance for this broad and far-reaching activity; hence, logistics became the 17th focus area. A December 2003 Army Logistics White Paper, "Delivering Materiel Readiness to the Army" [see <http://www.army.mil/features/LogWhitePaper2004/LogWhitePaper.doc> for text only or [http://www.army.mil/features/](http://www.army.mil/features/LogWhitePaper2004/LogWhitePaper.pdf)

### LOGISTICS IN OPERATION IRAQI FREEDOM: A Compelling Case for Change

SUCCESS	SHORTFALL
Soldier Initiative	In-Transit Visibility
Army Prepositioned Stocks (APS) End Items	Log Information Network
Performance of Reserves	Distribution Bottlenecks
CLASS III (Bulk)	Nuclear, Biological, Chemical (NBC) Suits
Colocated Log Command and Control (C2)	Body Armor
Defense Logistics Organizations	Short Deployment Time-Line
Deployment	Shortage of Spares
Use of Civilian Contractors	Stock Readiness
	Desert Boots and Clothing
	Individual Equipment

Source: HQDA

[LogWhitePaper2004/LogWhitePaper.pdf](http://www.army.mil/features/LogWhitePaper2004/LogWhitePaper.pdf) for text with images], identified four interdependent areas within logistics that are critical to the success of supporting a joint and expeditionary Army:

- **Connecting the Logisticians;**
- **Modernizing Theater Distribution;**
- **Improving Force Reception; and**
- **Integrating the Supply Chain.**

Operation Iraqi Freedom (OIF) posed many challenges to logistical doctrine, policies and organizations. Army Logistics at all levels struggled to keep pace as the coalition sprinted to





Baghdad. To ensure success on the next battlefield, it is paramount that the Army rapidly advance in its use of technology, integration of processes and updating of policies as they apply to Army and joint logistics. **The window of opportunity is fleeting.**

## CONNECTING THE LOGISTICIANS: SEEING THE REQUIREMENTS 24/7

Connecting the Logisticians is foundational to the other three areas, and it is fundamental to the success of an expeditionary force.

**Why Connect the Logisticians?** Army Logistics is changing to support an expeditionary force operating across a nonlinear, noncontiguous battlefield. Connecting the Logisticians is the linchpin of a distribution-based logistics system coupled with an integrated supply chain that will have the **speed and precision** to support the expeditionary Army. It will create a single sustainment process network that provides joint total asset visibility (JTAV) and a logistics common operational picture (LCOP).

Current logistics battlefield communications processes lack the flexibility, speed and availability to support expeditionary logistics. Army logisticians cannot “see the requirements” across the modern battlefield. Logisticians often resort to pushing



supplies forward based on their best estimate of what the force needs. Additionally, forces employed on the battlefield cannot “see the support” that is coming their way. As a result, Soldiers may order the same item several times because they have no confidence that support is on the way.

**The Way Ahead.** Connecting the Logisticians will allow the entire logistics community to “see and know” what the Soldier needs as soon as it is required. Army logisticians will become an integral part of the joint battlefield network with satellite-based communications (SATCOM) providing 24/7 connectivity. Tomorrow’s Army logisticians will be able to send and receive data continuously from the Soldier in the foxhole all the way back to the U.S. industrial sustaining base. This SATCOM technology will cover the entire battlefield and will provide Army logisticians the agility and flexibility to unplug from the network to operate in a stand-alone mode, and then quickly plug back in when the tactical situation allows.

SATCOM provides unmatched reliability, with far fewer potential points of failure than with terrestrial solutions, and empowers logisticians with a capability to support military operations anywhere in the world. **A non-line-of-sight (NLOS) sustainment network, similar to the familiar administrative and logistics network, is a required building block for the expeditionary Army.** Furthermore, logisticians must





## Getting There ... A Network-Enabled Force

# LANDWARNet

## Joint Battle Management Command & Control

Navy/USMC (FORCEnet)	Air Force (Command and Control Constellation)	Army/USMC (LANDWARNet)
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### ► Captures Emerging Network Capabilities

### ► Encompasses All Aspects of Evolving

- Battle Command
- Communications
- Information Management
- Decision Support

Source: HQ TRADOC

be able to operate their logistics network each day in garrison using the same “train as you fight” processes they will employ in combat.

This inherent satellite network capability will allow logisticians to tailor smaller, modular packages capable of supporting the maneuver commander anywhere on the battlefield without the limitations of current line-of-sight systems. The Warfighters Information Network-Tactical (WIN-T) must also provide Army logisticians this same capability when implemented.

Army major commands and the Army staff are working to ensure that logistics communications requirements and solutions are embedded within the Army’s LandWarNet. [Note: The Army announced in late February 2004 that LandWarNet is the name for its network enterprise. LandWarNet includes all Army networks—from sustaining military bases to forward-deployed forces.] **The components of the Enterprise Resource Planning (ERP) architecture—BattleCommandSustainment and Support System (BCS3), Global Combat Support System-Army (GCSS-A), Logistics Modernization Program (LMP) and Product Life-Cycle Management Plus (PLM+)**—are key to completely connecting the logisticians

**from the foxhole to the industrial base.** The LCOP will be enhanced by this network connectivity and will provide the joint force commander with the ability to “see” his force and to make decisions based on accurate, real-time logistics information.

## The Army must:

- connect critical logistics nodes. Tactical warehouses, ammunition supply points, hospitals and distribution hubs (e.g., airports and seaports of embarkation/debarkation) will form a sustainment network using commercial very-small-aperture terminals (VSAT) for long-haul communications, coupled with Combat Service Support Automated Information System Interface (CAISI) wireless equipment to provide local area network connectivity.
- ensure NLOS connectivity to the battalion level. Army logisticians require a commercial expeditionary data communications capability comprising man-portable SATCOM terminals (e.g., International Maritime Satellite, or INMARSAT).
- enhance logistics operations at the tactical level. BCS3 will provide the classified tactical logistics data warehouse serving the current and future Army and joint force. BCS3 will also

## LandWarNet Characteristics

- Connects elements of combat power and enables Battle Command.
- Consists of a “system” of pipes and applications.
- Provides connectivity between sensors and shooters.
- Promotes collaboration between commanders and staffs.
- Supports Home Station Reachback.
- Increases combat power by:
  - better synchronizing joint effects in the battlespace;
  - achieving greater speed of command;
  - increasing lethality, survivability, and responsiveness.



Source: HQ TRADOC





provide logistics planning and assessment tools to the logistician.

- integrate Automated Identification Technology (AIT) throughout the joint battlespace. AIT will enable tomorrow's logistics processes.

## MODERNIZING THEATER DISTRIBUTION: RESPONDING WITH SPEED AND PRECISION

The present Army distribution system lacks the flexibility, situational awareness, communications capacity and unity of effort needed to effectively respond to the needs of a joint and expeditionary Army. The distribution requirements must be identified and resourced concurrently with the changes made to the combat force structure and to the doctrine.

**Why Modernize the Theater Distribution System?** A modern theater distribution system is an end-to-end capability that receives retrograde materiel from the theater and delivers materiel readiness from the source of supply to the point of use. It must evolve from the outmoded logistics concepts of “just in case” and “just enough—just in time” to the next generation of distribution support, known as “**sense and respond**.” This system must rival the best examples of effective distribution



found in commercial industry, and it must be an integral part of the strategic distribution system supporting the joint force.

A modernized theater distribution system will provide:

- unity of effort with a single control element;
- total situational awareness with 24/7 communications connectivity;
- 100 percent visibility of the materiel flow throughout the system;
- modern delivery platforms that are enabled for continuous operations with satellite tracking, two-way communications, night-vision capabilities, enhanced reliability and integrated force-protection capabilities; and
- updated doctrine and processes that focus on rapid and precise time-definite delivery.

Success will always depend on Soldiers, civilians and contractors who are superbly trained and sufficiently resourced to deliver materiel readiness when and where required. Ultimately, the distribution system must provide reliable and predictable support that gains the confidence of both warfighters and logisticians.

**The Way Ahead.** Achieving this vision will require a transformed distribution system that integrates new



organizations, new processes (some adapted from the best industry practices) and an “infostructure” that shares data from the Soldier at the front line to the industrial sustaining base.

System visibility is based on an integrated information system that forms a distribution information system framework through which real-time and end-to-end information is shared. **Lack of visibility is the biggest impediment in today’s distribution system.** This results in customer uncertainty, and it encourages inefficiencies such as duplicate reordering. Lack of visibility hides bottlenecks, precludes accurate asset accounting, and forces unnecessary procurement at the national level. An integrated information system will provide the kind of asset visibility that will allow logisticians to respond to the ever-changing battlefield.

Flexible distribution is the ability to redirect and coordinate distribution assets and flow based on the dynamic tactical situation. In addition to sharing distribution information across the enterprise, distribution platforms must have the communications systems and tracking capabilities that will enable Army logisticians to control the flow of materiel anywhere, anytime.

To achieve this end state, **the Army must first develop and implement a modern distribution doctrine that captures the principles of industry**

**leaders and applies those principles in the military environment.** The Army must integrate AIT and the Movement Tracking System (MTS) into the distribution process, enabling every distribution platform and node to be a sensor. To continually improve the capabilities of its distribution platforms, the Army must develop a program to cyclically refurbish the tactical wheeled vehicle fleet by inserting new technologies. A modern theater distribution system is joint by nature. Tomorrow’s theater distribution system will support the joint force and will be the operational component of the Department of Defense (DoD) distribution process. The Army’s actions to modernize theater distribution will be in concert with the U.S. Transportation Command (TRANSCOM), the DoD distribution process owner.

#### **The Army must:**

- resource RFID, MTS and other AIT in coordination with the Army’s modularity efforts;
- insert maturing technology into current distribution platforms;
- develop intermodal cargo platforms compatible with the Theater Support Vessel (TSV), C-17 and C-130 aircraft, and the current wheeled vehicle fleet;
- resource the Precision Aerial Delivery System (PADS); and
- improve the strategic distribution process.

### **IMPROVING FORCE RECEPTION: OPENING THE THEATER**

The joint and expeditionary Army is hampered by the lack of an organizational construct to focus on joint theater-opening tasks. Today, the Army is forced to build ad hoc support organizations to open theaters. Force reception operations, strategic communications, initial sustainment support, and joint logistics command and control are critical if



the Army expects to simultaneously deploy, employ and sustain a joint expeditionary force. There will not be the luxury of time to “build” a theater base for this expeditionary force.

**The Current Picture.** The Army has invested heavily over the past 10 years in improving its ability to deploy rapidly from continental U.S. platforms. These “fort to port” upgrades of deployment facilities on installations, coupled with enhanced sea and air deployment capabilities—large medium-speed roll-on/roll-off (LMSR) ships and C-17 aircraft—delivered land combat power to the joint force commander in OIF in record time. Army Prepositioned Stocks (APS) allowed Soldiers assigned to heavy brigade combat teams (BCT) to fly into the theater, draw their equipment and be ready to conduct combat operations within days (rather than waiting weeks for that same equipment to make an ocean transit from home station). However, the Army’s ability to receive these forces did not benefit from a comparable 10-year investment.



Prior to OIF, APS consisted of two brigade sets afloat, two sets ashore in Southwest Asia, and one set ashore both in Europe and South Korea. The afloat APS previously contained watercraft and materiel handling equipment that enabled Army transportation units to operate seaports of debarkation. These traditional “port opening” tasks are no longer sufficient to deploy, employ and sustain a joint and expeditionary Army.

Current force structure for theater-opening functions comprises units that are not focused on the opening task and do not have the operational agility to meet mission needs.

**The Way Ahead.** The Army must now take the next step and build the capability to accomplish four primary theater-opening tasks:

- conducting force-reception operations. Open and operate airports and seaports of debarkation as part of the joint reception, staging and onward-movement mission.
- providing a single operational-level sustainment command and control (C2) element to the joint force commander.
- establishing initial sustainment operations to the deployed joint force, focusing on distribution-based support.
- providing logistics connectivity to enable end-to-end control over the deployment, employment and sustainment process.

The Army must design an integrated theater-opening capability that can deploy on the same timeline as its combat forces and, immediately





upon entry, execute critical sustainment tasks, i.e., arming, fueling, feeding Soldiers and receiving ships and planes carrying troops, equipment and supplies. Improved force reception enables the combat force to focus on the combat mission while a single logistics C2 element focuses on joint force generation.

**This theater-opening capability cannot be an ad hoc organization. It should be a support headquarters that has trained to the task with habitually aligned subordinate modules.** It should be able to interact with support units from sister services and coalition partners, and it must be able to expand quickly to meet theater growth.

The theater-opening headquarters must be able to plug into a logistics information network through secure, on-demand satellite communications. It must maintain real-time visibility of forces and supplies inbound to the theater through a logistics common operational picture that is populated by joint and service systems and technologies.

The Army must exploit every opportunity to exercise the theater-opening process with joint partners during unit training rotations through its three combat training centers and through its Battle Command Training Program.

**The Army must:**

- transform a portion of its current force structure into a theater-opening group. This capability must be championed within the defense community to gain support for an organization

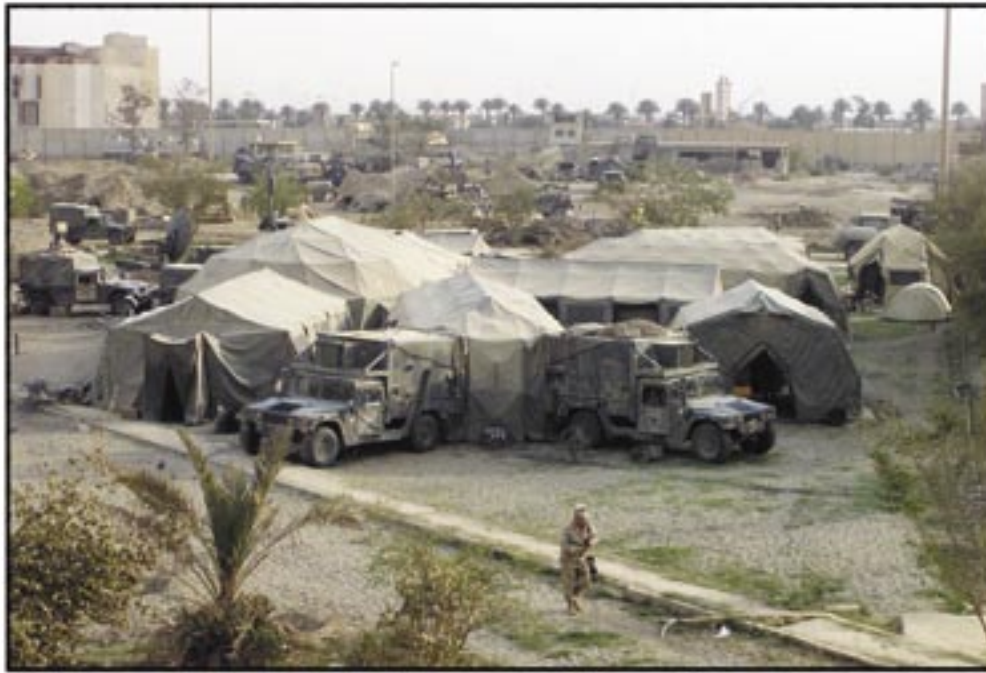
that can leverage joint assets to receive the joint force.

- develop a joint theater logistics structure in coordination with the other services. Efforts must focus on those sustainment tasks that are already designated as “joint” under the Executive Agency concept by the Office of the Secretary of Defense (OSD).
- replenish APS and reconfigure a portion of it into three Army Regional Flotillas (ARF). These squadrons will provide combat power, initial theater-opening assets and critical sustainment to support a BCT, and will provide the nation with the capability to support humanitarian assistance and disaster relief operations.
- rebalance combat support and combat service support units to give the active component the capability to deploy an integrated element to open a theater and to execute joint theater sustainment operations for the first 30 days. Expansion of theater sustainment operations beyond 30 days will become a core competency for the reserve components.

## **INTEGRATING THE SUPPLY CHAIN: HAVING WHAT IS NEEDED—FACTORY TO FOXHOLE**

Over the past several years, the Army has made inventory reductions at many echelons for a variety of reasons. The Army has changed its stockage policy to reduce the amount of items carried on unit prescribed load lists (PLL) while simultaneously reducing stock levels in many authorized stockage lists (ASL) throughout the force. Additionally, at the strategic level, the Army has underfunded the strategic spare parts program.

**The cumulative result of these reductions is a leaner supply chain without an investment in information technology or distribution systems.**



Consequently, Soldiers find themselves at the end of a very tenuous supply chain, without readily available critical supplies, and at the mercy of a fragile theater distribution system.

**The Current Picture.** Today, Army logisticians are unable to view the supply system in a holistic manner. The Army supply system was designed in layers, each layer serving as a backup or reinforcement to the layer below. This horizontal layering makes it difficult to understand the impact of actions across the entire supply chain, at each echelon and in each of the services. Supply decisions about what to stock, how many to stock, where to stock and when to stock are taken within each of these horizontal layers. However, these stock decisions have an impact across the entire supply chain, not just within a single horizontal layer. In fact, these decisions can severely strain the capabilities of the nation's industrial base.

Without a responsive, dependable distribution system, the Army will need to stock more items well forward in a theater to maintain readiness. Item managers at the national level cannot “see”

how their items are performing at the user level. To ensure that the supply system is effectively supporting the joint force, the Army must remove the horizontal layers and give the joint force a visible, integrated, seamless supply chain.

**The Way Ahead.** The Army needs **an integrated supply chain that has a single proponent**, allowing logisticians to “see” across the breadth and depth of resources in a joint, interagency and multinational theater. An integrated supply chain must:

- have a single supply process owner who is nested in the joint supply process;
- have weapon system managers who manage readiness of the systems using their authority over the supply chain;
- provide an authoritative, centralized repository of logistics data that will allow every echelon of both logisticians and warfighters the ability to “see” common data;
- enable stock positioning decisions that will allow precise and effective responses to warfighter requirements; and



- provide the ability to leverage joint, coalition and commercial resources to effectively deliver support to the combatant commander.

**The solution is an enterprise view of the supply chain and an integration of joint processes, information and responsibilities.** Customers and logisticians from all agencies and services will enter local supporting systems, plug into the sustainment network, and be afforded end-to-end JTAV. Combatant commanders will be capable of seeing inventory, both in motion and in available storage locations, and of rapidly making decisions that will maximize operational effectiveness.

**The Army must:**

- designate a supply process owner for the joint community and transition from item management to weapon system management at the national level.
- implement the Single Army Logistics Enterprise (SALE) strategy. Total asset and in-transit visibility infrastructure must be integrated within the ERP architecture to remove organizational stovepipes.

- continue funding of centralized development of ERP software such as BCS3, GCSS-A and LMP.
- fund Product Life-Cycle Management Plus (PLM+) to centralize management of weapon system technical data. Army Logistics enterprise integration will merge the information currently held in two logistics databases—the Integrated Logistics Analysis Program (ILAP) and the Logistics Information Database (LIDB)—into PLM+ to provide a single point of entry into the supply chain for warfighters and logisticians.
- procure and integrate Business Process Server (BPS) hardware, including RFID. This action will enable the Standard Army Retail Supply System (SARSS) to incorporate RFID data across the entire Army and replace the Materiel Release Order Control System (MROCS).

**INSERTING LOGISTICS TECHNOLOGY:  
THE ART OF THE POSSIBLE**

The above discussion of the four interdependent areas within logistics has outlined the path to bring Army Logistics into the 21st century. Logisticians are faced with preparing for deployment, force projection, sustainment of employed forces, redeployment and reset of forces. Advances in both basic science and cutting-edge material and information technology research promise novel technologies that could enhance logistics functions and platforms. To this end, Army logisticians must become knowledgeable of mature, advanced and emerging technologies so they can







exploit the applied benefits to logistics functions and platforms. **Using the four Army Logistics areas as the construct, the following highlights potential uses:**

**Connecting the Logisticians.** In the future, the logisticians will be seamlessly integrated into the warfighter's planning. This requires information fusion—the timely, accurate access to and integration of logistics knowledge across units and combat support agencies throughout the world, thereby providing reliable asset visibility and access to logistics resources. Common Logistics Operating Environment (CLOE) is an Army software architecture that will fuse platform health condition and consumables status to provide actionable knowledge to users and maintainers. Supplied with this knowledge, decision support software embedded within CLOE will facilitate optimal organization design and logistics support.

There is a wide range of emerging technologies that could provide the requisite communications capability for “Connecting the Logisticians” globally. The Army, in conjunction with the Defense Advanced Research Projects Agency (DARPA) and the National Laboratories, is assessing leap-ahead communications technologies such as terahertz light beams that offer the possibility of at least a 100-fold increase in the useable frequencies in any given bandwidth. Two other visionary efforts involve the use of disintegrating meteors as surrogate satellites to relay communication transmissions and the use of protein-folding technology to attain quantum leaps in computing speeds for decision support tools to handle massive quantities of logistics data.

These and other emerging technologies could provide the increase in communication capability required to connect the logisticians in real time from the industrial sustaining base to Soldiers engaged in combat operations. These technologies could provide dedicated logistics communications frequencies with no time or volume restrictions.

Additionally, Army research initiatives titled “On-the-Move Tactical Satellite Communications Technology” and “Dynamic Readdressing and Management for Army 2010” will also improve logistics communications.

**Modernizing Theater Distribution.** Precision Aerial Delivery (PAD), an Army program that has become joint (JPAD), provides strategic reach directly to the unit, presenting the possibility of eliminating traditional intermediate distribution nodes within the theater. PAD/JPAD will provide high-altitude offset airdrop for resupply of maneuver forces with an accurate drop-zone touchdown. Other Army initiatives include Integrated Logistics Aerial Resupply (ILAR), high-speed intratheater sealift such as the Theater Support Vessel (TSV), vertical short takeoff and landing (VSTOL) aircraft and future tactical truck concepts.

Instead of focusing on maximizing the use of limited strategic lift assets, **the Army is seeking ways to minimize the requirement for strategic lift.** Molecular replication being conducted in laboratories today offers the future possibility of manufacturing battlefield consumables such as food, medicines, munitions and other products at or near the point of consumption. This will minimize the requirement for strategic lift to transport these consumables over vast distances. Similarly, using proteins found in the spinach leaf that extract energy from biomass (from either sea or land) in close proximity to the point of consumption could reduce the demand for transporting fuel in the theater. Point-of-consumption water production research (including onboard vehicle systems) by the Army will further improve theater distribution and reduce lift demand.

**Improving Force Reception.** The capability to know the precise status (health) of equipment that is being prepared to deploy, prepositioned forward, engaged in decisive combat, or preparing to redeploy is essential to improving force recep-



tion. The Army is pursuing platform component physics-of-failure-based prognostics. Onboard processing technologies, coupled with artificial intelligence and sensors already in place, will provide the logistician and the warfighter with the real-time status of each piece of equipment. Planners and maintainers will know precisely which components will fail by specific bumper number, and which parts, tools and maintenance skills are required to replace those components. As parts are shipped from the depot or vendor, they will be tagged for the specific vehicle to expedite matching them up with that vehicle as it arrives in theater. An added benefit is the avoidance of collateral damage to other vehicle systems caused when parts fail during operation.

The highly portable, user-friendly Weigh-in-Motion (WIM) system will determine vehicle and

axle weights and center of balance in one-fifth the time required by previously used methods. WIM will ensure proper weight and balance and drastically speed up cargo loading at intermodal transfer points.

**Integrating the Supply Chain.** The Army's Smart Distribution program integrates automated supply chain planning, load configuration, assets visibility, theater distribution execution planning, and modernized theater distribution platforms. This capability is essential to making the supply chain efficient and effective.

Among many other initiatives is a joint Army/Navy program that exploits embedded microsensors and wireless communications (RFID tags and transponders) to determine the actual conditions that munitions have been subjected to during storage and shipment, and while employed with the combat unit prior to expenditure. Parallel efforts by the Defense Logistics Agency and the services will apply this technology to rations and other consumables.

The logistics community is working to ensure that Army logisticians are able to provide flexible and adaptive support on today and tomorrow's battlefields. They will do that by leveraging current technologies to improve visibility and response time across the entire supply chain. In the long term, supporting the development of emerging technologies and incorporating them into logistics systems will reduce the logistics demand on the battlefield while improving support to the Soldier.





CHARACTERISTICS OF EXPEDITIONARY SUSTAINMENT			
	OPERATIONAL AREA	THEATER BASE	STRATEGIC BASE
<b>INITIAL ENTRY; ANTI-ACCESS</b>	<ul style="list-style-type: none"> <li>• Self-sufficiency – staying power</li> <li>• Strategic reach by design</li> <li>• Always ready</li> <li>• Network capable</li> <li>• Distribution focused</li> <li>• Precision tactical resupply</li> </ul>	<ul style="list-style-type: none"> <li>• Situational awareness</li> <li>• Highly ready; short-notice deployable</li> <li>• Modular design for “plug ‘n’ play”</li> <li>• Theater opening-focused mission</li> <li>• Joint-capable design</li> <li>• Sustaining infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Reserve stocks</li> <li>• Situational awareness</li> <li>• Army Power Projection Program (AP3) capable</li> <li>• Integrated commands and agencies</li> <li>• Modular packaging</li> <li>• Seamless transition from peace to war</li> </ul>
<b>THEATER OPENING</b>	<ul style="list-style-type: none"> <li>• Forward focus</li> <li>• Immediate and responsive distribution</li> <li>• Total joint logistical awareness and asset visibility</li> <li>• Precision tactical resupply</li> </ul>	<ul style="list-style-type: none"> <li>• Joint/combined logistics command and control (C2) capable</li> <li>• Strategic communications enabled</li> <li>• Theater distribution operations capable</li> <li>• Force reception modular design</li> <li>• Can execute host nation support</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid response</li> <li>• Joint capabilities</li> <li>• Prepositioned capabilities</li> <li>• Defined supply chains</li> <li>• Effects-based planning and execution</li> </ul>
<b>THEATER EXPANSION</b>	<ul style="list-style-type: none"> <li>• Expansion capability</li> <li>• Maneuver and sustainment agility</li> </ul>	<ul style="list-style-type: none"> <li>• Contracting capabilities inherent</li> <li>• Modular plugs focused on functions               <ul style="list-style-type: none"> <li>– Force reception</li> <li>– Expanded distribution operations</li> <li>– Forward repairs</li> <li>– Life support</li> </ul> </li> <li>• End-to-end joint visibility capabilities</li> <li>• Self-organizing support networks</li> <li>• Dependable surge capability</li> </ul>	<ul style="list-style-type: none"> <li>• Worldwide distribution network</li> <li>• Forward repair capabilities</li> <li>• Flexible contract mechanisms</li> <li>• Requirement visibility</li> <li>• Maturing supply chains</li> </ul>
<b>THEATER SUSTAINMENT</b>	<ul style="list-style-type: none"> <li>• Nongovernment and private volunteer organization integration</li> <li>• Automated logistics systems reachback</li> </ul>	<ul style="list-style-type: none"> <li>• Expanding contracted/host nation support management tasks</li> <li>• Integrated logistics command and control for coalition/joint</li> <li>• Networked</li> <li>• Theater supply distribution center</li> </ul>	<ul style="list-style-type: none"> <li>• Industrial surge</li> <li>• Theater logistics status visibility</li> <li>• Retrograde visibility</li> <li>• Mature, adaptive supply chains</li> <li>• Global, multimodal distribution</li> <li>• Rapid national distribution of repair parts</li> </ul>

Source: HQDA





## WHAT IS NEEDED

Four major capability gaps exist in Army logistics. To sustain combat power, logisticians need:

- the ability to “see” requirements on demand via a logistics information network;
- a responsive distribution system enabled by in-transit and total asset visibility, and a single owner who has positive control end-to-end in the theater;
- a robust, modular force-reception capability—a dedicated and trained organization able to quickly open a theater and support flexible, continuous sustainment throughout the joint operations area; and
- an integrated supply chain with a single proponent who can leverage all resources in a joint, interagency and multinational theater.

## WHAT MUST BE DONE

As Operation Iraqi Freedom pointed out, logistics organization, doctrine and policy are struggling to keep pace within the 21st century battlefield. While the combat-arms part of the Army is changing dramatically, so too must Army Logistics—playing catch-up if necessary. This Torchbearer Report has discussed a set of requirements within the domains of doctrine, organization, materiel and facilities that must be addressed to fix the capability gaps in logistics. To make this happen, **Congress must fund DoD at an amount approximating 4 percent of the gross domestic product (GDP); increase the Army’s share of the DoD budget to at least 28 percent to maintain readiness; and expeditiously fund future commitments so the Army is not forced to internally reprogram dollars.** Otherwise, the same lessons will have to be revisited after the next war.





## TORCHBEARER MESSAGE



Army Logistics has undergone significant improvements in the past decade as a result of the lessons learned during Operation Desert Storm. Some of those improvements include the partial fielding of radio frequency identification devices (RFID) and the fielding of the palletized load system. Several of the greatest gains have been seen in the Army's capability to project power through programs such as the Army Power Projection Platforms (AP3), watercraft restationing plan and Army Prepositioned Stocks (APS). The joint community has also rallied to support the acquisition of large medium-speed roll-on/roll-off (LMSR) naval ships and C-17 aircraft. These initiatives have proven to be significant force multipliers.

Additionally, Army Logistics has worked to reduce the "iron mountains" of materiel through better business practices and enhanced supply and distribution automation efforts. To a large extent, these efforts have paid off. **What has not been realized is the end-to-end visibility over the supply chain and a responsive distribution-based transportation system focused on customer readiness.** These capabilities are vital to transforming Army Logistics into a system capable of providing effective expeditionary support to the Army.


Logistics organizations, doctrine, policies and associated enablers struggled to keep pace with the 21st century battlefield seen in Operation Iraqi Freedom (OIF). The headlines during and after the war shouted out the trials and tribulations of supplying the force. For the most part, tactical logistics has not fundamentally changed since the Cold War—while the combat-arms Army has changed dramatically. **Army Logistics now must rapidly advance in its use of technology, integration of processes, and updating of policies to ensure success on the next battlefield.** It must not go unnoticed—the Army Logistics successes in OIF were largely a result of the initiative and hard work of the individual logistics Soldiers. Those Soldiers made the difference and should be applauded for their tremendous efforts.

Published in December 2003, the Army Logistics White Paper "Delivering Materiel Readiness to the Army" identified four interdependent areas within logistics that must be addressed to fix problems that hampered logistics support during OIF:

- **Connecting the Logisticians;**
- **Modernizing Theater Distribution;**
- **Improving Force Reception; and**
- **Integrating the Supply Chain.**

Achieving these ambitious goals will require the fusion of all the logistics communities, Army and joint, to solve the issues described in the White Paper. It will be critical for the Army and joint communities to work hand-in-hand to develop solutions to these shortcomings. As the Lexington Institute's Daniel Goure stated at a Washington, D.C. conference in February 2004, "My understanding is that we came close to losing the war [based] on logistics." In response to that statement, Brigadier General Robert W. Cone, director of U.S. Joint Forces Command's Joint Center for Lessons Learned, stated that his organization is proposing major changes to logistics. That said, the Army's plan, already underway, is both sound and far-reaching. For Army Logistics to support the joint and expeditionary Army across the future battlefield, the changes described in this Torchbearer report must occur. The window of opportunity is rapidly closing. **Congress and DoD must fully support this vital undertaking.**





**For nearly 30 days after D-day, the requisition flow out of [3d Infantry Division] dwindled to a trickle. During three weeks of intense combat operations, the logistics requirements for this superb division were nearly invisible to the sustaining base because the division's logisticians could not pass their requirements off the battlefield. An expeditionary Army will not succeed if unit requirements are not visible in near real time.**

**Lieutenant General C. V. Christianson  
Deputy Chief of Staff, G-4**



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